

## O-01-03

**Brain activation predicts risk perception and attitude change for food technologies (#211)**Tyler Davis<sup>1</sup>, Markus LaCour<sup>1</sup>, Erin Beyer<sup>2</sup>, Jessica L. Finck<sup>3</sup>, Markus Miller<sup>2</sup><sup>1</sup> Texas Tech University, Psychological Sciences, Lubbock, US; <sup>2</sup> Texas Tech University, Animal and Food Sciences, Lubbock, US; <sup>3</sup> Merck Animal Health, Scientific Sales Affairs, Madison, US**Introduction:**

Compared to organic and traditional production techniques, food technologies such as GMOs and hormones are often seen as less positive, riskier, and lower value (Lusk et al., 2014). It is critical to understand the origins of consumer risk perceptions and attitudes, and their impact on receptiveness to information about food technologies. Previous neuroimaging research on food technologies has found that the lateral PFC, a region associated with processing economic uncertainty, tends to track participants' choices to pay more for organic foods (Lusk et al., 2015) whereas the ventromedial PFC tracks people's final subjective evaluations of foods (Crespi et al., 2015). We examined how regions of the brain tracked consumer attitudes, risk perception, and change in these constructs while participants read infographics depicting food technologies. We hypothesized that the lateral PFC would track perceptions of risk for food technologies and the ventromedial PFC would track positive attitudes. Further, we expected that the degree to which participants activated lateral PFC during processing of the infographics would be associated with change in risk perception.

**Methods:**

Participants (n = 53) were scanned on a 3 Tesla Siemens Skyra. The study was a block design, where participants read infographics depicting a food technology (hormones, antibiotics, vaccines, GMOs, animal welfare, sustainability) for 30s while considering the risks or benefits of the technologies and then answered questions about their attitudes and risk perception (Figure 1). The fMRI data was analyzed using a mixed-effects model implemented in FSL's FEAT and corrected for multiple comparisons ( $p < .05$ ) using a cluster-based correction (primary threshold:  $z = 3.1$ ,  $p < .001$ ).

**Results:**

For each infographic, participants perceived less risk and had more positive attitudes after being exposed to the infographics, relative to pre-infographic ratings (both  $p < .05$ ). The lateral PFC tracked differences in risk perception between infographics and was more active for the technologies seen as higher risk and less positive (Left: 1765 voxels,  $p < .001$ ; Right: 648 voxels,  $p < .001$ ; Figure 2). Left ventromedial PFC activation predicted more positive attitudes and was most active for the technologies perceived as lower risk (147 voxels,  $p = .049$ ).

For two of the infographics, brain activation predicted individuals' tendency to change attitudes or risk perception post-infographic. For the hormones infographic, participants who activated the lateral PFC more had less change

in risk perception from pre to post-infographic (Left: 194 voxels,  $p = .01$ ; Right: 229 voxels,  $p = .006$ ; Figure 3). Activation in the right supramarginal gyrus (708 voxels,  $p < .001$ ), a region of the parietal lobe associated with reading and decision making, positively correlated with attitudes for GMOs.

**Conclusion:**

Our results provide a unique window into how consumers process information about food technologies. The lateral PFC, a region linked with measures of economic uncertainty, was more activated for infographics depicting technologies associated with lower attitudes and higher risk perception. In contrast, ventromedial PFC activation positively correlated with attitudes and negatively correlated with perceived risk. Lateral PFC activation predicted individual differences in resistance to risk perception change for hormones, suggesting that these brain regions are implicated in how consumers form and update attitudes in response to information. The results suggest that fMRI can provide a valuable tool for understanding how consumers approach and react to information about food technologies.

## Notes

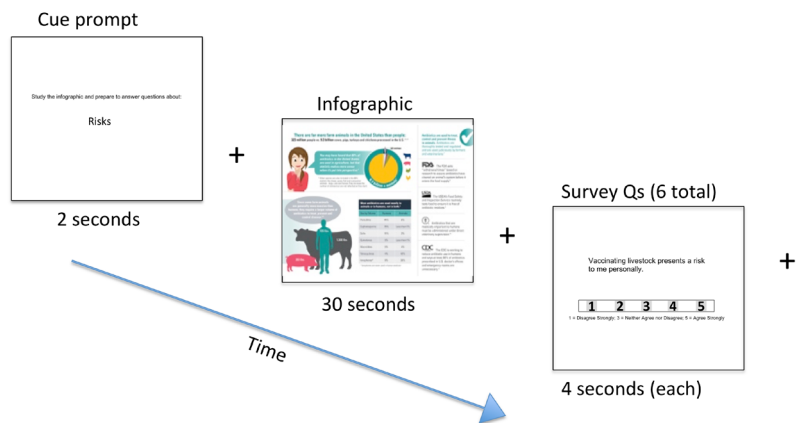
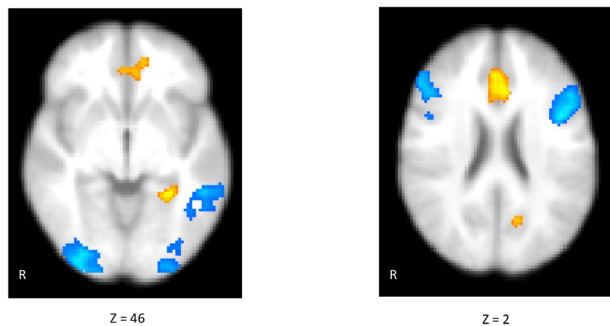


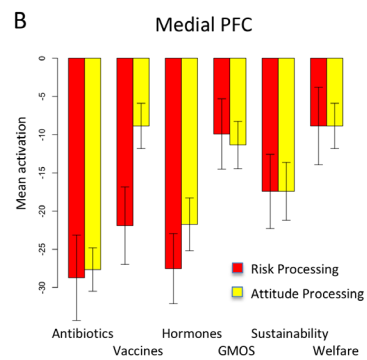
Figure 1 A depiction of the behavioral paradigm for the imaging task.

## Notes

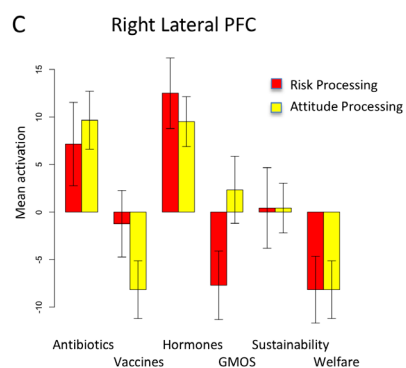
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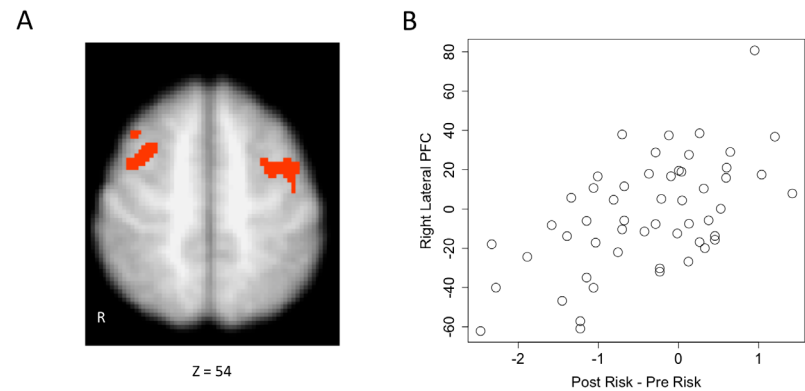


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**Figure 2** (A) A depiction of the brain regions that tracked risk and attitudes. (B) A bar plot illustrating how activation differed between infographics in the observed brain regions. Error bars indicate +/- 1 standard error of the mean.

Notes



**Figure 3** Results of the predictive modeling analysis. (A) Regions that track resistance to risk perception change for hormones. (B) A depiction of the observed relationship between risk perception change and lateral PFC activation.

## Notes